

IT IS CLAIMED:

1. A kit for detecting for detecting the binding of or interaction between each or any of a plurality of known, selected ligands and one or more target antigens, said kit comprising:

(a) a set of electrophoretic tag (e-tag) probes, the set comprising  $j$  members, and each of said e-tag probes having the form:

$(D, M_j) - L - T_j$ , where

(i)  $D$  is a detection group comprising a detectable label;

(ii)  $T_j$  is a ligand capable of binding to or interacting with a target antigen,

(iii)  $L$  is a linking group connected to  $T_j$  by a bond that is cleavable by a selected cleaving agent when the probe is bound to or interacting with the target antigen, wherein cleavage by said agent produces an e-tag reporter of the form  $(D, M_j) - L'$ , where  $L'$  is the residue of  $L$  attached to  $(D, M_j)$  after such cleavage,

(iv)  $M_j$  is a mobility modifier having a charge/mass ratio that imparts a unique and known electrophoretic mobility to a corresponding e-tag reporter of the form  $(D, M_j) - L'$ , within a selected range of electrophoretic mobilities with respect to other e-tag reporters of the same form in the probe set; and

(v)  $(D, M_j)-$  includes both  $D - M_j -$  and  $M_j - D -$ ;

wherein the uncleaved or partially cleaved e-tag probes, but not the corresponding e-tag reporter, is reactive with capture agent effective to impart a mobility to the probes bound to the capture agent that prevents the probes from electrophoretically migrating within said range of electrophoretic mobilities; and

(b) a capture agent effective to bind to uncleaved or partially-cleaved probes, said uncleaved and/or partially cleaved probes produced by:

(i) reacting the antigen(s) with the probe set under conditions that allow the probes to bind to or interact with the target antigen(s), and

(ii) treating the reacted target sequences with the cleaving agent under conditions effective to cleave target-bound probes at the  $L - T_j$  linkage, thereby producing a mixture of one or more corresponding e-tag reporters of the form  $(D, M_j) - L'$ , and uncleaved and/or partially cleaved e-tag probes, said capture agent being effective to

(i) impart a mobility to the probes bound to the capture agent that prevents the probes from electrophoretically migrating within said range of electrophoretic mobilities or

(ii) immobilize the probes on a solid support.

2. The kit of claim 1, wherein  $T_j$  is biotinylated and the capture agent is avidin or streptavidin.

3. The kit of claim 1, wherein  $T_j$  contains an antigen and the capture agent is an antibody or antibody fragment that binds specifically to the antigen.

4. The kit of claim 1, wherein  $T_j$  contains a particle or mass group that effectively prevents its migration under electrophoretic conditions within the range of electrophoretic mobilities of the e-tag reporters.